HITCHCOCK (ED.)

# A REPORT

OF

# TWENTY YEARS EXPERIENCE

IN THE

## DEPARTMENT OF PHYSICAL EDUCATION AND HYGIENE IN AMHERST COLLEGE,

TO THE BOARD OF TRUSTEES.

JUNE 27, 1881.

By Edward Hitchcock

*"The weaker the body is, the more it commands; the stronger it is, the more it obeys."*



AMHERST, MASS.:
PRESS OF C. A. BANGS & CO.,
1881.

# A REPORT

OF

# TWENTY YEARS EXPERIENCE

IN THE

## Department of Physical Education and Hygiene in Amherst College,

TO THE BOARD OF TRUSTEES.

JUNE 27, 1881.



---

*"There is nothing that a student ought to be more careful about than the sound condition of his flesh and blood."*—Prof. J. S. Blackie.

---

AMHERST, MASS.:
Press of C. A. Bangs & Co.,
1881.

# REPORT.

In presenting a report of the history of the first twenty years of the Department of Physical Education and Hygiene in Amherst College to its Trustees, the first and most natural mention should be made of the men who have been the most active in its inception and support.

To the Trustees of the College this department is chiefly indebted not only for its life, but for its success and growth. They have invariably given it their best counsels and wise supervision, and never has a dollar been asked for necessary work or supplies, but that it has been readily appropriated. And while it was at first with them considered an experiment in the College course, they have not ceased to watch it with interest and give their best efforts for its success.

To the wise and patient efforts of President Stearns, this department owes its beginning. We know of no thoughts farther back than those lying in his mind which demanded that an education and care of the body could and should be maintained in Amherst College at least. And up to the latest days of his life, it ever enjoyed his cordial support.

During all this period also, it has been our good fortune to have the services and advice of Dr. Nathan Allen, of Lowell, to maintain whatever has been good and might possibly be made better in the department.

Pecuniary aid and personal interest have also been cheerfully and kindly given by the late Hon. E. H. Sawyer, of Easthampton, in endowing the Sawyer Prizes, and by John H. Washburn, Esq., of New York, in thus far maintaining the Washburn Class Prize, without which it hardly seems possible that the present good attendance upon the exercises could be so fully and well maintained. And it is pleasant to announce to you that the same Prize will be continued by Frederick Gilbert, Esq., of Cincinnati, Ohio, of the class of 1877.

The Scholarships maintained by Mr. Birdseye Blakeman, of New York, and Mr. Henry N. Bigelow, of Clinton, have not only been of valuable service to this department, but they have also each contributed aid to worthy students in their college course, who were yet not made to feel that they were sustained by charity. A. L. Willston, Esq., of Florence, Mass., also proposes to sustain a scholarship for the benefit of a student giving aid in the music of the gymnastics.

The latest establishment of the Ladd Gymnastic Prizes is not the least aid which has been furnished us in this branch of the College course. They are given by Mr. Wm. M. Ladd, of Portland, Oregon, a member of the class of 1878.

In the Fall of 1876 Mr. Tanaka Fujimaro, Vice Minister of Education in Japan, came to Amherst and witnessed one of our class gymnastic exercises, with which he was so much pleased that the following year he requested President Seelye to engage and send to Japan a man able to introduce the Amherst system of gymnastics to the government schools in that country. Dr. George A. Leland, Class Captain of '74, was selected and has just completed his contract of three years service with "high satisfaction to the Government," as officially communicated to President Seelye.

The coöperation and help of the students to maintain this department has not been inconsiderable. In no other department of College has the management of the students been so much in their own control as in this. And, with the gradual letting go of many petty rules with which this work began twenty years ago, only good results have thus far been obtained. Up to the present time there has not been an instance of a class captain who has been disloyal or unfaithful to his work.

There are a few members of your Board who may remember some performances preliminary to the establishment of this branch of the College Curriculum about twenty-one years ago, when in Village Church, upon an elevated platform, before a large and interested audience, Dr. Winship exhibited himself as able to lift with his hands and shoulders immense weights. The hardware stores in town were levied upon to loan their casks of nails and spikes, the old iron of the College cellar was brought out, and all to enable Dr. Winship to show how much he could lift. And these feats, remarkable as they surely were, were then considered as indications of health, and held up to the students as the means for the true hygiene of college life. Soon the Gymnasium was equipped with apparatus, not the lightest of which

were one hundred pound dumb-bells, and apparatus by which a young man could be induced to try and lift a ton; and the dumb-bells for class exercises weighed ten pounds each. But at this time it was the prediction of Dr. Dio Lewis that we soon should adopt the lighter dumb-bells for exercise and discard the immense in muscular effort, which has proved true, for now we use bells that weigh two pounds to the pair, and the original lifting machines are in the pile of scrap iron.

The idea of physical culture has too often been that great muscular development is the only essential element in it, and the fact is indeed true that the really well man is muscularly strong. And for valetudinarians, for those who are able to give very much of their time, means and thought for their own health, who can give a large share of their energy and thought to self culture and preservation, without doubt the muscular system is the principal one to be attended to. But the problem to be solved by us has been what arrangement of required muscular exercise and recreation combined is the best for our students as a whole. In what way can we best help them to keep body and mind working harmoniously and effectually together? How shall the man physically be made efficient so that the intellectual, moral and spiritual may at the same time secure its full development?

In order that our students be in the best condition for work it seems demanded that the muscles be not trained to their highest powers. For, the most healthful and intellectual men are not those who have the most muscular power. They are often well developed men, it is true, and of excellent physical inheritance, but they are not *muscle* men.

Physical culture as expressed to Amherst College Students by the experience of the past twenty years means something besides, something in addition to muscular exercise. It includes cleanliness of skin, attention to stomach and bowels, relaxation from daily mental work, freedom from certain kinds of petty discipline, but with so much requirement and restraint as will give coherence, respect and stability to the methods of maintaining health and the men employing them.

The way in which students here are called upon to secure health, and its correct and normal maintenance for college requirements, is to be sure of some active, lively, and vigorous muscular exercise at stated periods; not requiring a rigid military or hardening drill of certain portions of the body, but offering them such exercises as shall while regularly obtained be vigorous, pleasant, recreative, and at the same time, even without a manifest consciousness of it, be calling into exercise their powers in active, vigorous, easy, and graceful movements.

Light wooden dumb-bells, weighing about one pound each, are placed in the hand, and then a series of movements are directed and timed by music, occupying in all from 20 to 30 minutes each day, which are simultaneously performed by a whole class under the lead of the Captain.

Believers in heavy gymnastics are apt to regard our exercises as perhaps well enough for girls and children, because they are only the swinging of one pound dumb bells for less than half an hour. And they would reflect upon the exercise and call it calisthenics, and not dignify it by the term gymnastics. To this we would only say, "what's in a name?" If calisthenics only accomplishes what we need, our wants are satisfied. And we doubt if some of those who "pooh, pooh" light dumb bell exercises are conscious of their utterances, or ever have swung even those wooden dumb bells with the vigor and energy of a College class, to a polka or any lively music, with the metronome at 90° for a continuous exercise. For certain it is that the young men at the close of one of these exercises, with the temperature at 60° have ordinarily secured moisture on the skin, are breathing full and deeply, the blood circulates, the abdominal viscera are sufficiently stimulated, and their muscles are limber and elastic; they have gained good exercise, and the whole man has the feeling that he has worked in a physical way, and yet is not exhausted. The whole body in the loose and easy uniform, unconstrained by a rigid piece of apparatus, is given a freedom of action which cannot be acquired by the stolid march, or the constraint of either fixed or many kinds of movable gymnastic apparatus; and lastly, the students generally feel, with all, that they have had a good time. And the mental and social freedom allowed and encouraged in these exercises conduces to the rapid and healthful evaporation of superfluous animal spirits, generated by the physical and mental confinement of study.

And while our methods are not so perfect as might be devised with more complete apparatus and better men to direct, if health of College be the only thing to be considered, they do seem to be good as far as they go; enough for the large majority, and of some service to all. And though there are some in every 40 or 50 young men among us who would be undoubtedly better for more stern and rigid discipline, yet College seems, with its present appliances and the time which can be taken for physical care and guidance, to be doing the best thing it can for the bulk of the students, in the matter of required exercises. And the rapid, easy, vigorous, and rythmical movements of a class,

guided and timed by music, with a light bell in each hand, heavy enough to require an appreciable muscular resistance, is what has been proven in Amherst College for twenty years a means of greatly promoting the health of the students.

During the first few years of our work, the simpler and easier forms of heavy gymnastic work were required of *all* the class; every man was expected to practice heavy gymnastics under direction of the leader, one of the class. This became very tedious work, irksome and impossible for some men to do except with such effort, moral and physical, as was injurious to be put on a large part of every class. Not all the men could, with advantage to themselves, make a vault, turn handsprings, take "dips," "walk grasshopper," or perform many other gymnastic feats, any more than every man could dance gracefully or lift enormously. But it was found out that the men who were sound in all four of their limbs and eyesight could go through movements enough with wooden dumb bells to secure the necessary muscular waste and development for healthful study, and hence no requirement for heavy gymnastic work has been made of any student for the past fifteen years. At the same time there are a few who take as naturally to heavy gymnastics, and as profitably too, as ducks to water, and these are allowed and encouraged to reasonable efforts in this direction. These at first are guided and watched, but they are at length allowed and expected to go on with their exercise in this direction at their own discretion, save with the aid of one of the older classes who has shown himself the best gymnast in College.

And once during each year a prize exhibition is held, when the individual students may compete with each other in heavy gymnastics, and the classes may show their proficiency in light exercises with dumb bells and marching. For the first few years, the morning hour was secured as the best time for the physical exercises of the College. And while in theory, and perhaps fact, this is the best time for exercise, yet the hour of early evening, between daylight and darkness, has come to be the time which we have of late most largely employed for gymnastics. At this hour the mind is weary from study, and if this work has been faithfully attended to, both the body and the mind demand physical exercise. Besides this, the relief to the eyes at this hour of the twenty-four is no inconsiderable reason why the twilight hour is considered by us as the appropriate and valuable one for gymnastic exercise.

It seems that we are warranted in saying that some of the vices so incident to young men are comparatively rare among our students. Perhaps this is due largely to the moral and religious influences of the College, but we believe it is not boastful to say that it is in part owing to the regular habits of physical exercise and recreation, and instruction in the Department of Physical Education and Hygiene, and to information given here on subjects of great importance to young men, and yet too often entirely ignored.

### Statistical Work and Results.

One of the first duties I felt called upon to perform after your appointment to this Professorship, was to prepare blanks for several anthropometric observations of the students of college. This I did partly to enable the students to learn by yearly comparison of themselves how they were getting on as regards the physical man. The ulterior object, however, was to help ascertain what are the data or constants of the typical man, and especially the college man. I have conceived no theory on the subject, and have instituted but very few generalizations; but my desire has been to carefully compile and put on record as many of these observations as possible for comparison and verification of statistical work in this same direction by many other persons in America and Europe.

In many of the final results of these twenty years data it is interesting to find a general correspondence to the established data of more numerous measurements of the human body, and in the variation from authorities of large experience we find the differences as a whole in favor of the student. These results seem to show that we must expect different physical characteristics in those who pursue the scholarly life, from others whose occupations are unlike them in so many ways, and when properly understood and carried out we believe that the advantages will be found on the side of the scholarly life.

In the fall of 1861, I took measurement of all the college students in seven particulars, and have faithfully made these examinations of almost every sound man since connected with the college up to the present date. The measurements are made of the Freshmen soon after entering, and are repeated upon them near the end of each year of the course. Thus every man who goes through college has been observed five times. These observations during the first year were the Age, Weight, Height, Chest Girth, Arm Girth, Fore-arm Girth and Body Lift. The second year the Capacity of the Lungs was

added, and for the last five years, the Finger Reach, and the Chest Expansion, and for the last two years the Comparative Strength of the two hands.

The AGE is taken in years and months from the last birthday.

The WEIGHT is secured in pounds and decimals of a pound, with the clothing averaging 3.50 pounds, which is not deducted in the general results.

The HEIGHT has always been taken in feet and decimals of a foot in slippers, for which we should deduct 1-7 of an inch. The decimals of a foot are preferred to inches and fractions, in order most exactly to place the men in position in the class line in gymnastic exercises, but in the subjoined tables the results are given in inches. The student stands with his muscles at rest upon a smooth board, with his back against a perpendicular support, the heels, buttocks, shoulders and head touching it, and the eyes directed by an easy glance upon the floor thirty feet distant. A sliding index is dropped from above with sufficient pressure to overcome the elasticity of the hair of the head.

CHEST GIRTH has been ascertained by a cotton or metallic tape graduated in inches and quarters. The tape is passed around the chest just beneath the arm pits, touching the lower angle of the shoulder blade and drawn around the body parallel with the floor, generally coming a little above the nipple. Then the student is told to inflate the lungs to their utmost capacity, keeping the shoulders down and back. As soon as the observation is made, he is told to exhaust as completely as possible, keeping the shoulders fixed still. The average between the two is the record, and the difference the chest expansion.

ARM GIRTH is determined by a tape drawn around the belly of the biceps and measured when the muscle is on its hardest contraction, with the forearm at a small angle to the arm.

FOREARM GIRTH is secured by bending the arm at right angles to the forearm, contracting the muscles of the latter and passing the tape at the inner angle of the elbow in a plane parallel to the direction of the upper arm.

By LUNG CAPACITY is meant a measure of the total amount of air which the student can force into a receiver after the lungs have been completely filled.

The BODY LIFT is indicated by the number of times the student can draw the chin up to the point of support, when hanging in free air from some point of support, and fully extending the arms after each lift.

The Finger Reach is the extreme distance between the tips of the fingers when extended laterally against the wall with the face against the wall. It is measured like the height.

The Comparison of Right and Left Hand Strength is ascertained by squeezing together in either hand two handles kept apart by a spiral spring graduated in pounds.

During twenty years past, 1861-2 to 1880-1 inclusive, measurements have been made of 2,106 different men on at least one occasion and each one of these has furnished a series of measures of the portions of his body as already described.

Table No. 1 shows the anthropometric relations of the students by classes and as a college. It gives the averages of the men as measured, many of them, at intervals of one year each; grouped by college classes it is true, and yet showing purely anthropometric relations. It not only gives the statistics of the average class man but it also gives the average of the man by the year of his life. The mean of a few items of the whole college is also appended to this table, which is seen more fully carried out in Table No. 3.

Table No. 2 exhibits the largest and smallest measures of each item of our total statistics of the twenty years.

Table No. 3 shows the means, not averages, of all our measurements. An average is the sum of all the values divided by the number of the observations, while a mean is a natural and easily recognizable central magnitude, all differences from which are deviations from a standard. It is the value at which the largest observations occur, and is graphically represented by a curve—the binomial curve. The *average* reduces all magnitudes to the same standard and gives no idea of the typical or complete magnitude, while the *mean* stands at the top of a curve descending both ways. The mean measures show what are the measures of the typical student, while the averages reduce all students to the same magnitude.

The Health of College, so far as figures and statistics can show it, must be represented by data of the sickness of students, and like the anthropometric observations, those of sickness are made from all the students, and by yearly reckonings. During these twenty years 5443 different *entries*, *not individuals*, have been on the Annual Catalogues. Of this number 1365 were entered on the sick list, representing those who during their course have been absent from all college duties on account of sickness for more than two consecutive days in term time. This gives a per cent. of the students by entries

as at one or more times disabled by illness, of 25.26. A noticeable point appears in the record of sickness as possibly showing the healthfulness of college life. It is the *decrease of illness from Freshman to Senior year*. The data are given in Table No. 4, but the fact of interest is that while the per cent. of Freshmen sick is 29.30, that of the Senior year is 19.05.

It may be thought, however, that as classes decrease in numbers perhaps the diminution of sickness is only on a par with the numerical falling off of the classes. But while the health increase of the course is 10.18 per cent., the natural dropping out is only 5.95 per cent.

The TIME LOST BY SICKNESS as averaged on every student is 2.65 days yearly. This of course is constructively applied. Although but 1375 students are recorded on the sick list, yet the number of cases of sickness recorded is 1725. This means that some have been on the sick list two or more times, or 25 per cent. of the whole sick number; and the amount of time actually lost from college exercises by each of the *sick men* has been 10.39 days on the average.

The MALADIES OF COLLEGE LIFE are those of youth and not debility or infirmities. As would be expected, colds and slight lung difficulties are the most numerous, constituting nearly one half of the whole amount, and while physical injuries stand second on the list of causes, it is instructive to learn that no serious or permanent injury has ever happened from the Gymnastic exercises, required or voluntary.

A natural inquiry is, if many of the students HAVE LEFT COLLEGE ON ACCOUNT OF ILL HEALTH. The point is not so easy to settle as are many others in hygiene or College management, since so often ill health is only a partial factor in the reason for discontinuing a college course. A student not infrequently is disappointed in money matters, class standing, society relations, disinclination for a special study, or kindred reasons, so that he is ready to say he is so ill that he cannot continue in college, and therefore our statistics in this direction, though secured with care and thought, are not considered as representing the whole case. Seventy, however, are reported as having left college on account of physical disability, or more than three each year. Of these, however, twenty-two or less than one third of the whole number have reëntered and graduated with a class next to the one which they first entered. Or, to put it numerically, 48 out of 2,106, or 2.27 per cent. of our students failed in their college course on account of sickness. Do the records of other occupations appear more favorably?

By the laws of viability, or chance of life in males from birth, as established by census returns and life insurance tables, this "chance of life," the world over, decreases from the ages of 15 or 16 on to 25, then rises to 30, and then falls to the end of our existence. Or, the curve of viability ascends rapidly from birth to 15 or 16 years, and then slowly descends to old age. But by the Health Records of our students we find a variation from this law, since we learn that sickness diminishes in our life here from 18 to 22 years of age. This fact, with some others already mentioned, discriminates in favor of the healthfulness of student life.

An item of record in the statistics of this Department has been that of Users of Tobacco. A man is called a tobacco user if he ever can or does smoke a pipe, a cigar or cigarette, or chew tobacco with pleasure to himself. This record is only complete for the 14 years past:—

| | | | |
|---|---|---|---|
| The percentage for all college years is, | | | 28.92 |
| " | " | Seniors, | 39.00 |
| " | " | Juniors, | 31.28 |
| " | " | Sophomores, | 25.78 |
| " | " | Freshmen, | 19.64 |

The query suggested is, does it increase in all classes of society in this or a similar ratio.

In table No. 5 are to be found the anthropometric data arranged to show their *relations to age alone*. Upon this table nine-tenths of the labor of compiling all these statistics has been bestowed, and yet but little need be said. And while our results do not exactly correspond with those of Quetlet, Baxter, and Bowditch, especially in the advanced years, we think it is owing to our scantiness of data in comparison with theirs, as well as the fact that the college student element in society is quite a different one from that of the army or the common school children. From their different trainings and surroundings, we ought to expect some variation in physical qualities. And we are strengthened in this conclusion from the results as shown from Table 4, indicating a decrease in sickness during the college course.

Another subject illustrated by this Department and its statistics is the *amount of growth*, and is seen in Table No. 6. This embraces many of the students who have completed the course, or given the data at entering and graduating, with a difference in time of three years and six months, and an age of 19.2 and 22.11. *749 men* have been measured, and these have furnished 5160 items of the seven different points of observation. Of all these MEN MEASURED, 26.15 per cent give an increase in *all the items* during the whole period observed. And 47.39 per cent of the men show some of the same measurements at

Senior as at Freshman year. And it is not the oldest or those least developed in whom this occurs. And 53.40 per cent give one or more items less at Senior than Freshman year, and 28.17 per cent give one or more items less, and also one or more the same. Of the ITEMS MEASURED, however, a different showing is made. The average of the whole 5160 items shows 76.97 per cent increased during the course, 13.58 per cent less at the end of the course, and 9.43 per cent the same as at entrance to college, and it will be seen that some men give both increased and diminished items: some items may be smaller and some items be larger at the same time. The average increase of the 26 per cent of these in *weight*, has been 12.27 lbs., 1.05 inches in *height*, 1.45 in *chest girth*, 0.85 inches in *arm girth*, 0.685 in *forearm girth*, 28.4 cubic inches in *lung capacity*, and nearly 4.50 times in *body lift*. This is what the college student may expect to grow from the 19th to 23d years of his life. The items and points of increase may be found in Table No. 6.

A part of the work in this department is instruction in the general Laws of Health, and Anatomy, and Physiology. The lectures in health are given the first term of Freshman year, and the subjects are those which specially pertain to student life, such as exercise, food, use of alcohol and tobacco, care of the eyes, the relation of body to mind, and kindred matters.

The instruction in human Anatomy and Physiology is given by study of a text book, a printed abstract, and illustrative lectures. Much of the illustration is aided by the elastic models of Auzoux, nearly $1,000 worth of which have been given to the college within the past few years. This study is taken up early in the Sophomore year. Optional study in comparative vertebrate Zoölogy has been carried on in addition to other work, and can be well illustrated by the collections in Appleton Cabinet.

A long stride in favoring the individual hygiene of the students is the recent erection of water closets and urinals; and it is not boastful or invidious to say that there are no material appurtenances of college more complete or perfectly constructed according to modern ideas of sanitary science than are these. And to supplement these great necessities and comforts, a Health Building with its apparatus and appliances, stands first and foremost. Not merely a Gymnasium, with means for developing the muscles,—and we want an improvement on our present one in this respect,—but the ability to attend to other matters of personal hygiene, such as cannot at present be satisfactorily found in the college dormitory or the boarding house. Bathing can

not now be secured by the student without great exposure, discomfort and expense. No greater material benediction could now be given to the college, which every student and the parents who send their sons here would feel, than the dropping down upon us of a well appointed health building, and it must surely come before long.

In athletic sports, rowing, base and foot ball, and college games generally, this Department has ever given encouraging though not inciting words. We have encouraged home sports and games, and not stimulated the young men to enter into the hot and violent contests with professional gamesters. With the example of the oldest and largest colleges, and with the comity, rivalry, and good fellowship so largely existing, it is but natural that our college should desire to compare its muscle and wind with those in similar positions. We have had several trials and been as successful as we ought to expect with smaller numbers to select from, and some disadvantages incident to our geographical location.

In our home athletic sports we have taken a deeper interest. The annual and semi-annual field days have always been well attended, both by contestants and spectators, and we have a good record. And the preparation and participation in these contests, this Department has ever regarded as a full equivalent for the required Gymnasium exercises, as they are always undertaken under leaders or directors, who have carried them through with systematic and thorough drill. And for the training of all the students, it seems clear that there are a certain number who must have these hard and severe tests in developing and maintaining their powers up to their best possibilities.

Besides the regular class exercises, as required, and the heavy work as encouraged and allowed, there are always a few who need special exercise and advice. These are attended to as well as our limited apparatus will allow. But in the coming near future when we can see an enlarged and well equipped health building, we may then hope for advanced hygienic development in the few who require special training to secure the normal and healthful development.

All of which is respectfully submitted,

EDWARD HITCHCOCK.

*Amherst College, Amherst, Mass.,*
*Barrett Gymnasium, June 27, 1881.*

# TABLE No. 1.

Measures of 2196 different students of Amherst College, showing the Averages of each class for twenty years, in Age, Weight, Height, Chest Girth, Arm Girth, Forearm Girth, Lung Capacity, Body Lift, Finger Reach, Chest Expansion, and the Comparative Right and Left Hand Strength.

| | Number Observed. | Age. | Weight. | Height. | Chest Girth. | Arm Girth. | Forearm Girth. | Lung Capacity. | Body Lift. | Finger Reach. | Chest Expansion. | Right Hand Strength. | Left Hand Strength. | Per Cent. strongest with Right Hand. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SENIORS. - - - | 1113 | 22.24 | 142.19 | 67.94 | 35.97 | 11.77 | 11.21 | 251.05 | 11.33 | 69.72 | 3.18 | 92.02 | 86.48 | 93 |
| JUNIORS. - - - | 1148 | 21.87 | 140.59 | 67.86 | 35.61 | 11.72 | 11.07 | 250.07 | 11.31 | 69.78 | 3.33 | 88.99 | 85.98 | 97 |
| SOPHOMORES. - | 1263 | 20.57 | 139.39 | 67.53 | 35.44 | 11.69 | 11.06 | 249.23 | 10.58 | 69.70 | 3.45 | 90.45 | 86.05 | 96 |
| FRESHMEN. - - | 1489 | 19.31 | 133.19 | 67.33 | 34.76 | 11.23 | 10.80 | 233.08 | 8.61 | 69.600 | 3.00 | 87.83 | 83.34 | 96 |
| *College Average.* | 5013 | 21.10 | 138.84 | 67.66 | 35.40 | 11.19 | 11.02 | 241.79 | 10.25 | 69.69 | 3.02 | 89.69 | 85.50 | 95 |
| *College Mean.* - | | | 131.00 | 67.50 | 35.50 | 11.25 | | 230.00 | 11.00 | | | | | |

## TABLE No. 2.

Showing the Maxima and Minima of every measurement of the 2106 students observed.

| | Age Years and Months. | Weight in Pounds. | Height in Inches. | Chest Girth in Inches. | Arm Girth in Inches. | Forearm Girth in Inches. | Lung Capacity in Cubic In. | Body Lift. | Finger Reach in Inches. | Chest Range in Inches. |
|---|---|---|---|---|---|---|---|---|---|---|
| Maxima, | 35.6 | 216 | 76.5 | 43. | 15.5 | 15. | 426 | 65 | 81.10 | 5.50 |
| Minima, | 15.3 | 84 | 58. | 27.25 | 8. | 8.25 | 115 | 2 | 48. | 1.50 |

## TABLE No. 3.

The *Mean Observations* of the measures of Amherst College Students for twenty years, from a total of 34,384.

| Weight in pounds. | Number. | Height in inches. | Number. | Chest Girth in inches. | Number. | Arm Girth in inches. | Number. | Lung Capacity in cubic inches. | Number. | No. of times Body Lifted. | Number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 175 | 69 | 72 | 104 | 40 | 61 | 14 | 44 | 340 | 53 | 21 | 88 |
| 167 | 105 | 71 | 291 | 39 | 165 | 13.5 | 81 | 320 | 94 | 20 | 176 |
| 159 | 238 | 70 | 385 | 38 | 394 | 13 | 323 | 300 | 275 | 18 | 372 |
| 151 | 490 | 69 | 808 | 37 | 704 | 12.5 | 602 | 280 | 608 | 16 | 610 |
| 143 | 798 | 68 | 955 | 36 | 1079 | 12 | 1117 | 260 | 871 | 14 | 790 |
| 135 | 1157 | 67 | 986 | 35 | 1164 | 11.5 | 1205 | 240 | 1287 | 12 | 940 |
| 127 | 1198 | 66 | 790 | 34 | 1098 | 11 | 1245 | 220 | 1275 | 10 | 1075 |
| 119 | 982 | 65 | 571 | 33 | 682 | 10.5 | 658 | 200 | 732 | 8 | 796 |
| 111 | 487 | 64 | 371 | 32 | 310 | 10 | 316 | 180 | 379 | 6 | 590 |
| 103 | 163 | 63 | 208 | 31 | 104 | 9.5 | 77 | 160 | 148 | 4 | 302 |
| 95 | 46 | 62 | 65 | 30 | 41 | 9 | 17 | 140 | 39 | 2 | 120 |
| | 5733 | | 5534 | | 5812 | | 5685 | | 5761 | | 5859 |

# TABLE No. 4.

Data of Student Sickness and Physical Disability for nineteen years and nine months in Amherst College.

Student's names on the annual Catalogues 1861 to 1881 inclusive, 5443.

| | Names on An'l Catalogues for 20 years. | Names on Sick List. | Per Cent of each Class to whole College. | Per Cent of Sickness in each Class to whole College. |
|---|---|---|---|---|
| Seniors, | 1192 | 260 | 21.90 | 19.05 |
| Juniors, | 1270 | 319 | 23.33 | 23.37 |
| Sophomores, | 1465 | 386 | 26.92 | 28.28 |
| Freshmen, | 1516 | 400 | 27.85 | 29.30 |
| | 5443 | 1365 | 100.00 | 100.00 |

| | |
|---|---|
| Students on the sick list, - - | 1375 |
| *Cases* (not individuals) of sickness, - | 1725 |
| Cases on sick list more than once in the year, | 350 |
| Per cent of college on the sick list, - | 25.26 |

The Maladies of the students, and their proportion, when it equals one or more per cent of the whole. This is the number of *cases*, not students.

| Maladies. | Per Cent. | Maladies. | Per Cent. |
|---|---|---|---|
| Colds, Pneumonia, Bronchitis, &c., | 37.4 | Liver and bilious, | 2.3 |
| | | Neuralgia, | 1.8 |
| Physical injury, | 8.8 | Malaria, | 1.7 |
| Febriculœ, | 4.8 | Mumps, | 1.7 |
| Eyes — weak and sore, | 4.7 | Diphtheritic, | 1.1 |
| Quinsy and sore throat, | 4.6 | Measles, | 1.1 |
| Boils, | 4.1 | Teeth, | 1.1 |
| General inability, | 3.1 | Stomach, | 1.1 |
| Typhoid fever, | 3.1 | Overwork, | 1.0 |
| Bowels, | 2.6 | | |

## TABLE No. 5.

The measures of Weight, Height, Chest, Arm Girth, Lung Capacity, and Body Lift of 2,106 different students of Amherst College, arranged by age.

| Age. | Number of Observations. | Weight. | Height. | Chest. | Arm. | Lung Capacity. | Body Lift. |
|---|---|---|---|---|---|---|---|
| 17 | 330 | 131.99 | 66.60 | 33.87 | 11.12 | 224.8 | 8.58 |
| 18 | 1172 | 134.07 | 66.96 | 35.10 | 11.36 | 238.7 | 10.35 |
| 19 | 1511 | 135.84 | 67.30 | 35.38 | 11.52 | 240.3 | 10.82 |
| 20 | 1358 | 138.12 | 67.95 | 35.52 | 11.57 | 248.8 | 10.97 |
| 21 | 1171 | 140.00 | 68.01 | 35.58 | 11.69 | 250.1 | 10.84 |
| 22 | 807 | 141.07 | 68.11 | 35.98 | 11.77 | 250.8 | 10.92 |
| 23 | 559 | 141.21 | 68.31 | 36.29 | 11.71 | 257.0 | 10.63 |
| 24 | 362 | 142.42 | 68.44 | 37.23 | 11.74 | 261.0 | 10.62 |
| 25 | 216 | 145.12 | 68.68 | 36.66 | 11.79 | 263.6 | 10.11 |
| 26 | 141 | 144.91 | 68.82 | 37.46 | 11.81 | 262.5 | 10.71 |
| 27 | 71 | 144.40 | 68.30 | 36.95 | 11.84 | 268.4 | 10.37 |
| 28 | 30 | 140.71 | 68.52 | 36.28 | 11.57 | 269.8 | 8.51 |
| 29 | 19 | 142.68 | 68.09 | 36.41 | 11.51 | 260.5 | 9.86 |
| 30 | 18 | 146.50 | 69.19 | 36.70 | 11.61 | 279.5 | 7.50 |

## TABLE No. 6.

Giving the measures of 749 students of Amherst College at two intervals of three years and six months, and at an average age of 19 years and two months at the first observation, showing their physical development during this period.

| | | Per cent. |
|---|---|---|
| Number of *men* measured, | 749 | |
| " " increased in all items, | 196 | 26.15 |
| " " decreased in some items, | 401 | 53.40 |
| " " both same and increased items, | 355 | 47.39 |
| " " " " decreased items, | 211 | 28.17 |
| Number of *items* secured, | 5160 | |
| " " showing increase, | 3972 | 76.97 |
| " " same Freshman and Senior year, | 487 | 9.43 |
| " " less on Senior year, | 701 | 13.58 |

| | Weight. pounds. | Height. inches. | Chest. inches. | Arm. inches. | Forearm. inches. | Lung Capacity. cubic in. | Body Lift. |
|---|---|---|---|---|---|---|---|
| Greatest individual gain, | 56 | 6 | 6.50 | 4 | 3.50 | 1.34 | 25 |
| Averages of increased men, | 12.27 | 1.05 | 1.45 | 0.853 | 0.685 | 28.4 | 4.50 |
| Per ct. of decreased items, | 11.00 | 0.00 | 20.31 | 13.46 | 25.27 | 14.64 | 20.13 |